

## Beneficial effects of vestibular stimulation in limiting thyroid modulation in females with Premenstrual syndrome.

Sneha Baby<sup>1</sup>, Kumar Sai Sailesh<sup>1</sup>, Minu Johny<sup>2</sup>, Mukkadan J K<sup>3\*</sup>

<sup>1</sup>Department of Physiology, Little Flower Institute of Medical Sciences and Research, Angamaly, Kerala, India.

<sup>2</sup>Department of Research, Little Flower Medical Research Centre, Angamaly, Kerala, India.

<sup>3</sup>Dr. J K Mukkadan, Research Director, Department of Research, Little Flower Medical Research Centre, Angamaly, Kerala, India.

\*Corresponding author: E-Mail: drmukkadan@gmail.com

### ABSTRACT

The purpose of the present study was to provide preliminary evidence for vestibular modulation of thyroid function in female with PMS. Aggregate of 20 female participants served as self controls, were included in the study. After recording the baseline values, in pre menstrual period (7 days before menstruation) of menstrual cycle, the participants were made to swing on a swing for vestibular stimulation as standardized per previous studies. Post intervention values were recorded in the premenstrual period of 1<sup>st</sup> and 2<sup>nd</sup> month.

In order to avoid diurnal changes all parameters were recorded at 9am. Stress levels were recorded by using perceived stress scale. T3, T4, TSH were assessed by ABBOT (CMIA) method and cholesterol by drychemistry analyzers with intellicheck technology. Significant decrease in the perceived stress scores, TSH and total cholesterol was observed followed by vestibular stimulation.

By stimulation of the vestibular system significant increase was observed in the total thyroxine. For the positive effect of vestibular stimulation in the management of PMS, our study has provided adequate evidence. We recommend further detailed studies with higher sample size to recommend vestibular stimulation as an alternative therapy in the management of PMS for the benefit of the population.

**KEY WORDS:** Premenstrual syndrome, Vestibular Stimulation, Alternative Therapy.

### INTRODUCTION

PMS is stress induced psycho-physiological disorder and stress is the cause of symptoms of PMS. Contemporarily a precise pharmacological treatment of PMS has not been introduced but non-pharmacological interventions are helpful in relieving PMS symptoms (Bhawana Sharma, 2013). It is certain that among the endocrine disorders in the world, the most prevailing is the thyroid disorder. It also prevails in india. Informations from previous studies have revealed that around 42 million Indians are contracted with thyroid diseases (Kumar Sai Sailesh, 2014).

Stress is the negative response to any factor which affect the body's controlling abilities to maintain homeostasis. Stress may cause thyroid auto immunity (Mizokami, 2004). Vestibular apparatus is known as membranous labyrinth and is enclosed in bony labyrinth of temporal bone.

Vestibular system includes otolith organs and semicircular canals. Stimulation of vestibular apparatus in a controlled manner helps proper functioning of endocrine secretions and regulate autonomic nervous system, reduces pain, stress and insomnia (Sailesh, 2014). It was hypothesized that thyroid function could be modulated by vestibular stimulation by the connection with paraventricular and arcuate nucleus (Varsha Varghese, 2015). To provide preliminary evidence for vestibular modulation of thyroid functions in females with PMS.

## 2. METHODS & MATERIALS

### Methodology

**Participants:** The present experimental study was conducted at LFMRC in physiology department, Angamaly. Totally 20 female participants with informed consent were included in the study. The recruitment of participants was conducted by putting a notice on the college notice boards which includes vestibular modulation and its benefits. The willing participants were screened for premenstrual syndrome by using standard PMS questionnaire (Moos R 1968; Mahajan KK,., 1980). Participants with PMS were sampled and then selected and the following inclusion and exclusion criteria were used to recruit the participants.

### Inclusion criteria:

- Healthy females with PMS having regular cycles from 28-34 days.
- Willing participants.

### Exclusion criteria:

- Students with thyroid disorders and other endocrine disorders under treatment or under medication.
- Students with vestibular and hearing disorders.
- Students with psychiatric and neurological disorders.

**Study design:** Experimental study.

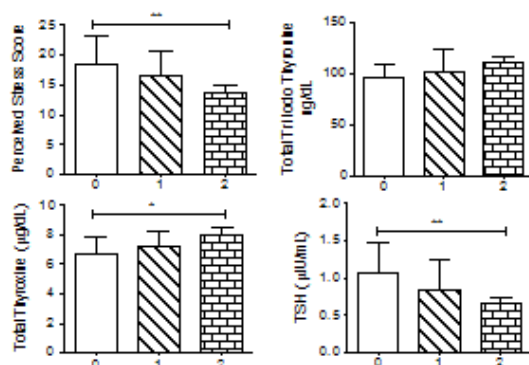
**Vestibular stimulation:** The participants acted as self-controls. After recording the baseline values (during premenstrual period), the intervention was provided once in a day for three months, with the participants made swing on a swing (kumar Sai Sailesh 2015; 2016). Post intervention values were recorded during premenstrual period of first, second and third cycles and compared.

**Outcome measures:** T3, T4, TSH by ABBOT (CMIA) method and cholesterol by drychemistry analyzers with intellicheck technology (Varsha Varghese, 2015).

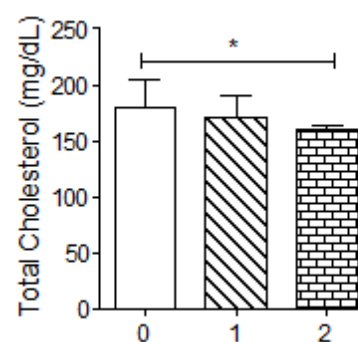
**Data analysis:** Data will be analysed by SPSS 20.0. Statistical tests that applied are one-way ANOVA and post hoc tests. P value < 0.05 will be considered as significant.

### 3. RESULTS

Followed by vestibular stimulation the perceived stress score and TSH levels were significantly decreased. Though there is increase in T3 and T4 levels, T3 is not statistically significant (Fig.1). Total cholesterol level was significantly decreased followed by vestibular stimulation (Fig.2).



**Figure.1. Perceived stress score, Thyroid profile of the participants before and after vestibular stimulation.**



**Figure.2. Total cholesterol levels before and after vestibular stimulation**

### DISCUSSION

It was revealed that 58% of females having PMS in certain occasion, and 42% of females having PMS frequently. In India studies reveal that 20% of them suffer PMS in which 8% have severe symptoms. Also reports showed that suicide intentions existed with about 10% (Shruti Brahmhatt, 2013). PMS symptoms are high like almost 80-90% in which 5% are women who suffer severely and affect their daily activities. 25% of adolescent girls experienced PMS and PMS among highly educated women are common and increased possibility of stress with PMS is also seen. Prevalence of PMS much more in age group of 15-49years (5.9-90% among this age group) and between (Fikru Wakjira Tolossa, 2014).

PMS also prevails among college students (Chintan Madhusudan Raval, 2016). Our study shows, Vestibular stimulation is provided by making them swing as to their comfort. It was proved that in ancient times motion devices helped in the treatment of madness (Vieth, 1795; Jütte, R. 2009).

However, use this technique as an analgesic agent is recent (Luzia Grabherr, 2015). Vestibular stimulation decreased the pain in migraine patients, amputees, and paraplegics. However, the degree of pain relief varied (Kolev, 1990). Ramachandran and colleagues reported that vestibular stimulation is a powerful method for pain relief (Ramachandran, 2007).

Vestibular stimulation may relieve pain by modulating somato-sensory perception through its connections with raphe nuclei, nucleus tractus solitarius, thalamic nuclei (Kumar Sai Sailesh, 2013). It was proven that PMS is a stress induced psycho physiological disorder and stress is the cause of most of the PMS symptoms vestibular stimulation relieves stress by inhibiting stress axes and there by relieving the stress. In our study we noticed much decrease in PSS levels.

Earlier studies proved that vestibular stimulation decreases depression, stress scores as well as serum cortisol levels. Research shows that there is an anatomical connection between vestibular and autonomic nuclei. And any vestibular lesion can cause autonomic abnormalities (Biaggioni, 1998). The total thyroxine level was increased followed by vestibular stimulation. Studies shows that stress can cause change in the thyroid function (Board, Francis, 1956). Through the stress axis vestibular stimulation can suppresses the stress induced thyroid changes directly through the HPT axis and indirectly (Mukkadan, 2015).

**Limitations:** The sample size is less and we could not maintain control group.

### 4. CONCLUSION

Our study provides further evidence for beneficial effect of vestibular stimulation in the management of PMS. We recommend further detailed studies with higher sample size to recommend vestibular stimulation as an alternative therapy in the management of PMS for the beneficial of population in general.

**REFERENCES**

- Bhawana Sharma, Rajesh Misra, Kiran Singh, Rajeev Sharma and Archana. Comparitive study of effect of anuloma-viloma (pranayam) and asana in premenstrual syndrome, *Indian j physiol Pharmacol*, 57 (4), 2013, 384-389.
- Biaggioni I, Costa F, Kaufmann H, Vestibular influences on autonomic cardiovascular control in humans, *J Vestib Res*, 8 (1), 1998, 35-41.
- Board, Francis M.D, Persky, Harold, Hamburg, David A. M.D, Psychological Stress and Endocrine Functions, Blood Levels of Adrenocortical and Thyroid Hormones in Acutely Disturbed Patients. *Psychosomatic Medicine*, 18 (4), 1956, 324-333.
- Chintan Madhusudan Raval, Bharat Navinchandra Panchal, Deepak Sachidanand Tiwari, Ashok Ukabhai Vala, and Renish Bhupendrabhai Bhatt, Prevalence of premenstrual syndrome and premenstrual dysphoric disorder among college students of Bhavnagar, *Indian J Psychiatry*, 58 (2), 2016, 164–170
- Fikru Wakjira Tolossa and Mebratu Legesse Bekele, Prevalence, impacts and medical managements of premenstrual syndrome among female students, cross-sectional study in college of health sciences, Mekelle University, Mekelle, Northern Ethiopia, *BMC Women's Health*, 14, 2014, 52.
- Jütte R, Schwindelerregend, Drehmaschinen in der vormodernen Psychiatrie, in *Körper, Dinge Und Bewegung, Der Gleichgewichtssinn in Materieller Kultur Und Ästhetik*, R. Schönhammer (Ed.) Facultas, Wien, 2009, 128–139.
- Kolev O, How caloric vestibular irritation influences migraine attacks, *Cephalalgia*, 10, 1990, 167–169.
- Kumar Sai Sailesh and J.K, Mukkadan. Controlled Vestibular Stimulation, Standardization Of A Physiological Method To Release Stress In College Students. *Indian J Physiol Pharmacol*, 59 (4), 2015, 436-441.
- Kumar Sai Sailesh, Archana R, Antony NJ, Mukkadan JK, Controlled Vestibular Stimulation, Supplementary Treatment for Hypothyroidism. *Research Journal of Pharmaceutical, and Biological and Chemical Sciences*, 5 (3), 2014, 1842-1845.
- Kumar Sai Sailesh, Archana R, Controlled Vestibular Stimulation, A Physiological Method of Stress Relief. *J Clin Diagn Res*, 8 (12), 2014, BM01–BM02.
- Kumar Sai Sailesh, Archana R, Mukkadan J K, Impact of traditional vestibular stimulation on depression, anxiety and stress in college students. *Biomedical Research*, 27 (2), 2016, 295-297.
- Kumar Sai Sailesh, George Jissa, Mukkadan J K, Cancer pain relief by vestibular stimulation, 2 (4), 2013, 2319-4154.
- Luzia Grabherr, Gianluca Macaudo and Bigna Lenggenhager. The Moving History of Vestibular Stimulation as a Therapeutic Intervention, 28 (5-6), 2015, 653-657.
- Mahajan KK, Maini BK, Study of symptoms associated with menstrual cycle in working women of Rohtak *Ind Med Gaz*, 64, 1980, 350–353.
- Mizokami T, Wu Li A, El Kaissi, Wall JR, Stress and thyroid auto immunity *Thyroid*, 14 (12), 2004, 1047-55.
- Moos R, The development of menstrual distress questionnaire, *Psychosomatic Med*, 30, 1968, 853–867.
- Mukkadan J K, Archana R, Kumar SS, Varsha VP, Arati A, Reddy UK, Stress, thyroid hormone secretion and vestibular stimulation, A review of links. *BEMS report*, 1 (2), 2015, 31-34.
- Ramachandran V.S, McGeoch P.D. and Williams L, Can vestibular caloric stimulation be used to treat Dejerine–Roussy syndrome? *Med Hypotheses*, 69, 2007, 486–488.
- Sailesh KS, Mukkadan JK, Vestibular modulation of endocrine secretions-A review, *Int j Res Health Sci*, 2 (1), 2014, 68-78.
- Shruti Brahmhatt B.M, Sattigeri, Heena Shah, Ashok Kumar, Devang Parikh, A prospective survey study on premenstrual syndrome in young and middle aged women with an emphasis on its management, *Int J Res Med Sci*, 1 (2), 2013, 69-72.
- Varsha Varghese P, Kumar Sai Sailesh, Archana R, Mukkadan J.K, Vestibular modulation of thyroid function in forced cold water swimming stress induced wistar albino rats, *Int J Res Ayurveda pharm*, 6 (4), 2015, 513-515.
- Vieth G.U.A, *Versucheiner Encyklopädieder Leibesübungen*, Hartmann, Berlin, Germany, 1795.